

Please enter the following new claims 8-19.

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8. A thermal sensor circuit for sensing the temperature of an integrated circuit chip, the thermal sensor circuit comprising:

- a sensing device that produces a sensed voltage corresponding to the temperature of the integrated circuit chip;

- a first current mirror having first and second mirror legs respectively carrying first and second mirror currents that are directly proportional to each other, the first mirror leg being in series with the sensing device; and

- a compensation circuit that includes:

- an input that receives an input current;

- a first transistor coupled between the input and a first supply voltage reference and having a control terminal;

- a second transistor coupled between the second mirror leg and the first supply reference and having a control terminal coupled to the control terminal of the first transistor; and

- a third transistor coupled between a second supply voltage reference and the first supply voltage reference and having a control terminal coupled to the control terminals of the first and second transistors.

9. The thermal sensor circuit of claim 8 wherein the compensation circuit further includes a fourth transistor coupled between the second mirror leg and the control terminals of the first, second, and third transistors, and having a control terminal coupled to the input of the compensation circuit.

10. The thermal sensor circuit of claim 9 wherein the first, second, third, and fourth transistors are bipolar transistors.

11. The thermal sensor circuit of claim 8, further comprising:

- an output comparator having first and second inputs and an output, the first input being coupled to the sensing device to receive the sensed voltage;

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a reference voltage circuit having an input and an output at which a reference voltage is produced, the output of the reference voltage circuit being coupled to the second input of the output comparator; and

a second current mirror having a first mirror leg coupled to the reference voltage circuit, and a second mirror leg coupled to the input of the compensation circuit to provide the input current.

12. The thermal sensor circuit of claim 11 wherein the second current mirror has a third mirror leg and the reference voltage circuit includes:

a fourth transistor coupled between the third leg of the second current mirror and the first supply voltage reference and having a control terminal corresponding to the output of the voltage reference circuit; and

a fifth transistor coupled between the first leg of the second current mirror and the first supply voltage reference and having a control terminal corresponding to the output of the voltage reference circuit.

13. The thermal sensor circuit of claim 12, wherein a ratio of an emitter area of the fifth transistor to an emitter area of the sixth transistor is $M:1$, where $M > 1$.

14. The thermal sensor circuit of claim 11 wherein the first and second current mirrors are connected to the second supply voltage reference and include p-n-p bipolar transistors in their respective first and second mirror legs.

15. A thermal sensor circuit for sensing the temperature of an integrated circuit chip, the thermal sensor circuit comprising:

a sensing device that produces a sensed voltage corresponding to the temperature of the integrated circuit chip;

an output comparator having first and second inputs and an output, the first input being coupled to the sensing device to receive the sensed voltage;

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a reference voltage circuit having a first input and an output at which a reference voltage is produced, the output of the reference voltage circuit being coupled to the second input of the output comparator;

a first current mirror having first and second outputs, the first output being coupled to the first input of the reference voltage circuit;

a second current mirror having first and second outputs, the first output being coupled to the sensing device; and

a compensation circuit having first and second inputs coupled respectively to the second outputs of the first and second current mirrors.

16. The thermal sensor circuit of claim 15 wherein the compensation circuit includes:

a first transistor coupled between the first input of the compensation circuit and a first supply voltage reference and having a control terminal;

a second transistor coupled between the second input of the compensation circuit and the first supply reference and having a control terminal coupled to the control terminal of the first transistor; and

a third transistor coupled between a second supply voltage reference and the first supply voltage reference and having a control terminal coupled to the control terminals of the first and second transistors.

17. The thermal sensor circuit of claim 16 wherein the compensation circuit further includes a fourth transistor coupled between the second input of the compensation circuit and the control terminals of the first, second, and third transistors, and having a control terminal coupled to the first input of the compensation circuit.

18. The thermal sensor circuit of claim 17 wherein the first, second, third, and fourth transistors are bipolar transistors.

19. The thermal sensor circuit of claim 15 wherein the first current mirror includes: